

NASA TECH BRIEF



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Improved Process for Synthesizing Anilinosilane Compounds

A new process has been developed for producing good yields of anilinosilane compounds that can be readily isolated in a high state of purity. A variety of di- and tri-anilinosilanes, including diphenyl-, dimethyl-, methylphenyl-, methylvinyl-, phenylvinyl-, and methylallyl-dianilinosilanes and trianilinophenylsilane, were successfully prepared by this process. The key to the process is the use of *s*-collidine (2,4,6-trimethylpyridine) as an HCl acceptor. The silane compounds are of interest in that they can be melt-condensed with aromatic diols to provide a wide variety of high molecular weight polyaryloxysilane materials that are of potential importance in polymer technology.

Previously reported syntheses of anilinosilanes require the condensation of the corresponding chlorosilane with excess aniline, which functions as an HCl acceptor. These reactions are reversible and provide generally low, nonreproducible product yields which are difficult or impossible to isolate in the pure state. In the new process, it is believed that *s*-collidine plays a unique role as an HCl acceptor in that it is a stronger base than the aniline, with which it competes, and because it apparently forms sterically hindered HCl salts that cannot reversibly interact with the anilinosilanes. As a result, the reaction mixtures are relatively free from side products, greatly facilitating isolation of highly pure anilinosilanes by crystallization and/or vacuum distillation. These compounds

have been prepared in yields ranging from 50 to 90 percent and in a high state of purity as determined from their melting and boiling points and elemental analysis.

The new process is carried out by condensing stoichiometric amounts of aniline with the appropriate chlorosilane in tetrahydrofuran in the presence of *s*-collidine. The insoluble *s*-collidine hydrochloride salts are removed from the reaction mixture by filtration, the filtrates are concentrated, and the pure anilinosilanes are isolated from the concentrates by either crystallization or vacuum distillation.

Note:

No further documentation is available. Inquiries may be directed to:

Technology Utilization Officer
Marshall Space Flight Center
Huntsville, Alabama 35812
Reference: B70-10105

Patent status:

Inquiries about obtaining rights for the commercial use of this invention may be made to NASA, Code GP, Washington, D.C. 20546.

Source: W. R. Dunnivant and R. A. Markle of
Battelle Memorial Institute
under contract to
Marshall Space Flight Center
(MFS-14948)

Category 04



NASA TECH BRIEF

Development of a New Type of Rocket Motor

The development of a new type of rocket motor has been completed by the NASA Langley Research Center. The new motor is designed to provide a higher thrust and a longer burn time than the conventional rocket motor.

The new motor is based on a novel design which allows the combustion chamber to expand as the motor burns. This expansion increases the volume of the combustion chamber, which in turn increases the thrust and the burn time of the motor.

The new motor is being tested in a series of experiments at the NASA Langley Research Center. The results of these experiments are expected to be published in the near future.

The new motor is being developed for use in a variety of applications, including space exploration and missile defense.

The new motor is being developed by a team of scientists and engineers at the NASA Langley Research Center. The team is led by Dr. [Name], who is the principal investigator of the project.

The new motor is being developed as part of a larger program to develop new technologies for space exploration. The program is being funded by the NASA Office of Management and Enterprise Development.

The new motor is being developed in cooperation with the NASA Marshall Space Flight Center. The Marshall Center is providing the facilities and equipment needed for the development of the motor.

The new motor is being developed as a technology demonstration. The results of the development are expected to be used in the design of future rocket motors.

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